

1       1. A capillary array electrophoresis plate, comprising:  
2           an array of separation channels formed on said plate; and  
3           an array of sample reservoirs formed on said plate and  
4          coupled to said separation channels.

1       2. The plate of claim 1, wherein said array of sample  
2          reservoirs are organized into one or more sample injectors.

1       3. The plate of claim 2, further comprising a waste  
2          reservoir positioned in each sample injector.

1       4. The plate of claim 3, wherein one of said waste  
2          reservoirs is coupled to one or more sample reservoirs in each  
3          sample injector.

1       5. The plate of claim 1, further comprising a cathode  
2          reservoir, said cathode reservoir being connected to one or more  
3          separation channels.

1       6. The plate of claim 1, further comprising an anode  
2          reservoir common to one or more separation channels.

1       7. The plate of claim 1, wherein the plate has one set of  
2          reservoirs positioned near an outer perimeter, and one set of  
3          reservoirs positioned near a center and the separation channels  
4          connect the reservoirs near the outer perimeter to reservoirs

1 near the center.

1           8. The plate of claim 7, wherein the separation channels  
2 radially connect the outer perimeter to the center.

1           9. The plate of claim 1, further comprising an electrode  
2 array coupleable to said reservoir array.

1           10. The plate of claim 9, further comprising a reservoir  
2 array layer having an array of openings coupleable to said  
reservoir array.

1           11. The plate of claim 1, wherein said reservoir array is  
2 regularly spaced in one or two dimensions on said plate and  
3 adapted to engage a multi-headed pipetter.

1           12. A capillary array electrophoresis plate, comprising:  
2           a plurality of separation channels formed at a surface of  
3           said plate;

4           one or more anode reservoirs formed at a surface of said  
5           plate; and

6           one or more injectors formed at a surface of said plate,  
7           said injector having:

8           a plurality of sample reservoirs formed on said plate  
9           and coupled to said separation channels;

10          a plurality of waste reservoirs formed on said plate

1 and coupled to said separation channels; and  
2 at least one cathode reservoir multiplexed with a  
plurality of said separation channels.

1 13. The plate of claim 12, further comprising an electrode  
array coupleable to said reservoirs.

1 14. The plate of claim 12, wherein the plate has an outer  
2 perimeter and a center and the separation channels connect the  
3 outer perimeter to the center.  
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10 15. A capillary array electrophoresis plate comprising:  
11 an array of microfabricated separation channels formed at a  
12 surface of a first microfabricated substrate and a corresponding  
13 surface of a second substrate bonded to said first and second  
14 substrates, each of said channels having first and second ends;  
15 an array of sample reservoirs formed at a surface of said  
16 plate;  
17 an array of waste reservoirs formed at a surface of said  
18 plate;  
19 an array of cathode reservoirs coupled to the first end of  
20 each of the separation channels;  
21 an array of anode reservoirs coupled to the second end of  
22 each of the separation channels; and  
23 an injector formed by an injection channel connected to one  
24 or more sample reservoirs that crosses a separation channel and

10 connects to a waste reservoir.

1       16. The capillary array electrophoresis plate of claim 15,  
2 wherein both substrates are microfabricated.

1       17. The capillary array electrophoresis plate of claim 15,  
2 wherein the substrates are made of glass.

1       18. The capillary array electrophoresis plate of claim 15,  
2 wherein the substrates are made of plastic.

1       19. The capillary array electrophoresis plate of claim 15,  
2 wherein one or more separation channels are connected to a common  
3 cathode reservoir.

1       20. The capillary array electrophoresis plate of claim 15,  
2 wherein one or more separation channels are connected to a common  
3 waste reservoir.

1       21. The capillary array electrophoresis plate of claim 15,  
2 wherein one or more separation channels are connected to a common  
3 anode reservoir.

1       22. The capillary array electrophoresis plate of claim 15,  
2 wherein one or more sample reservoirs are connected to one  
3 separation channel and one or more waste reservoirs.

1. 23. The capillary array electrophoresis plate of claim 15,  
2 further comprising a reservoir array layer mounted above the  
3 plate, the reservoir array layer having openings positioned to  
4 couple to the sample reservoirs, the waste reservoirs, the  
5 cathode reservoirs, and the anode reservoirs.

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7 24. The plate of claim 15, further comprising an electrode  
8 array coupleable to said reservoir array layer.

3 25. The capillary array electrophoresis plate of claim 15,  
4 wherein the first substrate has an array of electrodes aligned  
5 with the sample reservoirs, the waste reservoirs, the cathode  
6 reservoirs, and the anode reservoirs to make electrical contacts  
7 with the solutions in the reservoirs.

1 26. The capillary array electrophoresis plate of claim 24  
2 wherein said electrode array is integral with the two substrates.

1 27. The capillary array electrophoresis plate of claim 26,  
2 wherein the sample reservoirs are regularly spaced on the plate  
3 to receive solutions from a multi-headed pipetter system.

1 28. The capillary array electrophoresis plate of claim 15,  
2 wherein the plate has H holes, and wherein H is approximately  
3 equal to  $5N/4$ , with N being the number of samples to be

1 processed.

1           29. The capillary array electrophoresis plate of claim 15,  
2 wherein the distance from each cathode reservoir to a  
3 corresponding injector is approximately equal and where the  
4 distance from each injector to its corresponding anode reservoir  
5 for each separation channel is approximately equal.

1           30. The capillary array electrophoresis plate of claim 15,  
2 wherein the plate is made of glass or plastic.

1           31. A method of forming a capillary array electrophoresis  
2 plate, comprising:

3           forming an array of microfabricated separation channels at a  
4 surface of the plate;

5           forming an array of microfabricated sample reservoirs at a  
6 surface of the plate; and

7           connecting the array of microfabricated sample reservoirs to  
8 the array of microfabricated separation channels.

1           32. The method of claim 31, further comprising grouping the  
2 array of sample reservoirs into one or more injectors.

1           33. The method of claim 32, further comprising forming a  
2 waste reservoir in each sample injector.

1           34. The method of claim 33, further comprising multiplexing  
2       a cathode reservoir with the sample reservoirs.

1           35. The method of claim 34, further comprising multiplexing  
2       an anode reservoir to all sample reservoirs on the plate, wherein  
3       a distance from each cathode reservoir to a corresponding  
4       injector is approximately equal and where the distance from each  
5       injector to its corresponding anode reservoir for each separation  
6       channel is approximately equal.

1           36. A method for injecting a sample through a capillary  
2       array electrophoresis plate with microfabricated separation  
3       channels connected to sample reservoirs, waste reservoirs,  
4       cathode reservoirs, and anode reservoirs, the method comprising:

5           applying an injection voltage between a first reservoir and  
6       a waste reservoir to draw the sample into a cross channel region  
7       while applying a bias voltage to the cathode and anode reservoirs  
8       to control injection plug width;

9           applying a running voltage between the cathode and anode  
10      reservoirs; and

11           applying a biasing voltage to the waste and injector  
12      reservoirs to pull away residuals of the sample.

Pd2 > A2

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